Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

$$\varDelta=\frac{2^{14}3^2}{\pi^8b^8}\int_0^\pi\int_0^\theta\int_0^\phi\int_0^\psi\int_0^\pi\int_0^\mu\int_0^\nu\int_0^\omega\int_0^{x}\int_0^{w}\int_0^{y}\int_0^{z}\int_0^{s}\int_0^{t}\int_0^{u}\int_0^{v} A\sin\theta\sin\phi$$

$$\times\sin\psi\sin\rho\sin\mu\sin\nu\sin\omega\sin\lambda d\theta d\phi d\psi d\rho d\mu d\nu d\omega d\lambda dx dw dy dz ds dt du dv$$

$$=\frac{2^{12}3^2ab}{\pi^8}\int_0^\pi\int_0^\theta\int_0^\phi\int_0^\psi\int_0^\pi\int_0^\mu\int_0^\nu\int_0^\omega[\sin(\theta-\phi)+\sin(\phi-\psi)+\sin(\psi-\rho)$$

$$+\sin(\mu-\nu)+\sin(\nu-\omega)+\sin(\omega-\lambda)+\sin(\lambda-\rho)-\sin(\theta+\mu)]\sin^2\theta\sin^2\phi\sin^2\psi\sin^2\rho$$

$$\times\sin^2\mu\sin^2\nu\sin^2\omega\sin^2\lambda d\theta d\phi d\psi d\rho d\mu d\nu dd\omega\lambda,$$

$$=\frac{2^63ab}{\pi^4}\int_0^\pi\int_0^\theta\int_0^\phi\int_\theta^\psi[\sin(\theta-\phi)+\sin(\phi-\psi)+\sin(\psi-\rho)]\sin^2\theta\sin^2\phi\sin^2\psi\sin^2\rho$$

$$d\theta d\phi d\phi d\rho\qquad+\frac{2^{12}3^2ab}{\pi^8}\int_0^\pi\int_0^\theta\int_0^\phi\int_0^\Phi\left\{\left(\frac{\pi^2}{45}-\frac{43264}{496125}\right)\sin\theta+\left(\frac{\pi^2}{45}-\frac{43264}{496125}\right)\sin\rho\right.$$

$$\left.+\left(\frac{\pi^3}{72}-\frac{352\pi}{4725}\right)\cos\rho-\left(\frac{\pi^3}{72}-\frac{352\pi}{4725}\right)\cos\theta\right\}\sin^2\theta\sin^2\phi$$

$$x\sin^2\psi\sin^2\rho d\theta d\phi d\psi d\rho$$

$$=\frac{ab}{\pi}\left\{5-\frac{7667}{240\pi^2}\right\}+\frac{2^{14}ab}{45\pi^7}\left\{\frac{\pi^2}{8}-\frac{352}{525}\right\}\left\{\pi^2-\frac{43264}{11025}\right\}.$$

A partial solution was received from *Professor F. P. Matz.*

5. **Proposed by DE VOLSON WOOD. M. A., C. E., Professor of Mechanical Engineering, Stevens Institute of Technology, Hoboken, New Jersey.**

An actual case suggested the following:

An equal number of white and black balls of equal size are thrown into a rectangular box, what is the probability that there will be contiguous contact of white balls from one end of the box to the opposite end? As a special example, suppose there are 30 balls in the length of the box, 10 in the width, and 5 (or 10) layers deep.

Solution by Professor P. H. PHILBRICK, M. S., C. E., Lake Charles, Louisiana.

There are 5.10=50 rows and 50×30=1500 balls. The probability will be found by supposing the balls to be drawn singly and at random and the rows formed by the balls as drawn one after another.

The total number of ways of drawing the balls $=|\underline{1500}=a$. To find the number of ways of drawing the balls so that 30 white balls may form a row, 30 white balls may be selected out of 750 in $\frac{750.746\ldots.721}{1.2.3\ldots.30}=b$ ways. The remaining 1470 balls can be drawn in $|\underline{1470}=c$ ways. In order that a given selection of 30 white balls may form a row they must be drawn either before or after the other 49 rows, or between some of them, giving 50 positions.

The number of favorable cases is equal to the product of the last three quantities $=50bc$. Hence the probability is, $\frac{50bc}{a}$.

Also solved by *Professor W. H. Draughon.*

[Note.—This solution is not entirely satisfactory, since the white balls may be contiguous from one side of the box to the other without being in longitudinal lines. The problem is as if it were required to find the probability of passing from one side of the box to the other by passing through white balls, and white balls only, under the conditions named. The problem is a pretty good one and if any one will furnish a complete solution to it, we will publish it in the next issue of the MONTHLY. ED.]

PROBLEMS.

9. **Proposed by H. C. WHITAKER, B. S., M. E., Professor of Mathematics, Manual Training School, Philadelphia, Pennsylvania.**

Four numbers taken at random are multiplied together. What is the probability that the last digit will be 0?

10. **Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College. New Windsor, Maryland.**

Upon a surface one foot square, a coin one inch in diameter is thrown; what is the chance the coin *touches* or *intersects* both diagonals?

11. **Proposed by ARTEMAS MARTIN, A. M., Ph. D., LL. D., U. S. Coast and Geodetic Survey Office, Washington, D. C.**

Find the average area of a triangle formed by joining a corner of cube with any two points within the cube.

12. **Proposed by Professor G. B M. ZERR, A. M., Principal of High School, Staunton, Virginia.**

A large plane area is ruled by two sets of parallel eqidistant straight lines, the one set perpendicular to the other. The distance between any two lines of the first set is a; the distance between any two lines of the second set is b. If a regular polygon of $2n$ sides be thrown at random upon this area, find the chance that it will fall across a line, the diameter of the circum-circle of the polygon being less than a or b.

Solutions to these problems should be received on or before August 1st.

MISCELLANEOUS.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

SOLUTIONS TO PROBLEMS.

7. **Proposed by Rev. A. L. GRIDLEY, Pastor of Congregational Church, Kidder, Missouri.**

Making no allowance for the curvature of the earth and supposing the sun to rise in the east and set in the west, what would be the course of a man who should walk constantly toward the sun from morning until night? How far and in what direction from the staring point would he be, walking three miles per hour, at the end of three days?

Solution by H. C. WHITAKER, B. S., C. E., Professor of Mathematics, Manual Training School, Philadelphia, Pennsylvania.

Let the azimuth of the sun and of the direction in which the man is walking be counted from the south toward the west and let it be denoted by ϕ. Take as the origin the position of the man at noon and let the time (t) be counted